

The details of the technique are given in (Bull. No. 9, I. A. B. 1933) and consist in giving the seeds the amount of moisture just necessary for embryonic development and exposing them to the intense conditions necessary for the progress of the reproductive phase. It is hoped by such means to materially shorten the growth of cotton so as to ensure a sufficiently long close period.

The other method is to breed by hybridisation, a type of American cotton which will give the two pickings before the 15th May. Fortunately Uganda cottons are found to be the earliest of American cottons. When crossed with Co. 2, some of the plants in F_2 population portended to produce types which will come up to our ideals. Progenies of the promising cultures are in the F_3 generation at present.

In conclusion it may be said, the lines on which we propose to proceed for solving the *Pempheres* problem are:—

1. The production of early types of cotton which would enable us to observe a long close period.
2. The evolution of selections which will not permit the insect to breed in the plant.
3. Isolation of types that will get over the injury done by the insect very quickly.
4. Recommending the adoption of such agricultural practices which will considerably reduce the surviving insect population.
5. Detection of parasites that will effectively keep the insects under control during their developmental phase.

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References.

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THE MANGO FRUIT PRESERVE

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The mango fruit is admittedly the best of all fruits. Containing the vitamins necessary for proper nutrition, the fruits may be eaten in plenty. There is a method of drying the fruit juice by which surplus fruits could be utilised during seasons of plenty. This mango fruit-preserve has many virtues of the fruit. There is no satisfactory device known to garden-owners for preserving the fruits,

but the fruit juice can be, by a cheap process, dried and kept over two years without undergoing deterioration. Very few, in the circars, take to this business, and most garden-owners allow their surplus produces to rot in the market, or to be disposed off at a loss. As a subsidiary occupation in the mango season, the manufacture of the preserve can be taken up and if possible exported with profit. The mango juice preserve compares favourably with foreign jams, jellies, and other much advertised preserves. The author studied the preparation of the juice practically, with a view to find how far it would pay him and since the results were promising, he ventures to publish this note, so that the method might become known to a wider circle.

Method of manufacture. This fruit-preserve manufacture must be taken up from April to June, when the fruits are in abundance, and the sun is hot. Costly and delicious fruits like *Rajamanu*, *Goa*, *Suwarnareka*, *Banganapalli*, *Neelam* etc. which have no fibre in the pulp, generally find ready sale in the market. It is in the ordinary variety of fruits the trouble arises due to less demand, and these are good enough for our purpose; only, the juice must not be too thin or too acid in taste. It must be fairly ropy in consistency, and sweet. The costly fruits, if they are not disposed off, may also be used to supplement the inferior ones. But they should not be chosen in place of ordinary cheap mangoes, as the final fruit-preserve will not repay the cost of the fruits. The fruits are washed in cold water to free from dirt, gum and other matter on the surface of the fruits. The fruit is squeezed thoroughly and the juice collected in suitable vessels. The fruit-rind is much liked by cows and may be fed to them, alone, or with bran. As many fruits as one can utilize for the day should alone be squeezed, for, the juice should not be kept over for the next day. When all the fruits are squeezed, the juice is then well stirred to form a homogeneous mass. A bamboo mat preferably, or palmyra or date leaf mat of suitable size is spread flat. Any sweet oil is thinly spread on the top surface to enable the final product be easily removed. The juice is now poured on the mat and with a clean hand, evenly smeared over the whole surface. The quantity of juice sufficient for one such layer will have to be judged by experience. However, it should not be too thick, for, it will not dry up soon, and the preserving quality will be poor. The drying up of the juice should begin when the sun is bright. The mat should be placed on a high-level ground, or bench to avoid as far as possible, dust, ants and flies. Birds voraciously feed on the juice if not watched. When the first layer is just drying up as indicated by the brown colour formation, it should be levelled up, by gently passing a clean mangonut over the surface, to form an even surface. When after some time, the finger does not stick to the surface, it is ready for pouring another layer of juice over it. As above, the juice is poured and smeared evenly, to form a second layer. When this

dries up, the operation is continued till the sun's rays can help the drying. During a clear day when the sun is bright, five to six layers can be put in. Whatever the number of layers laid, it is necessary that the layers are allowed to dry perfectly. Otherwise, putrefaction will set in, and the labour is wasted. During the night the mat must be kept inside, away from rats, silver-fishes, cock-roaches ants &c. If the bamboo trays are one cubit square each, they are suitable to be hung up indoors. If the trays are larger, or mats are used, there is some inconvenience. Hence bamboo mats of one cubit square, each, and any number of them as one can manage may be had for convenience. For two days the juice as it is expressed is used. But from the third day onwards, the juice will have to be filtered through a thin muslin. Metal sieves should not be used as they spoil the taste and colour of the preserve. Simply pouring the juice over the cloth, will not filter it completely. By clean fingers, the juice in the cloth will have to be rubbed against the cloth, till all the juice is filtered, leaving only a small quantity of fibrous matter which is thrown out, or fed to cows. This preliminary operation should be done sufficiently early in the morning to be ready for drying the juice. The need for filtering is to avoid the useless fibrous matter, bits of fruit rind, and to give good appearance to the final product. On every eighth or tenth day, crystalline sugar is finely sprinkled over the juice after it is evenly spread. This gives better taste, makes the preserves keep longer, and fetches better price. One may continue this preserve manufacture, as long as fruits are available cheap and the sun is bright. When a sufficiently thick layer is formed, the preserve is lifted at the bottom with a blunt knife, cut into neat sizes, wrapped in butter-paper, and enclosed in attractive card-board boxes. The mango-preserve will keep well if periodically dried in the sun.

The writer during this season prepared the preserve and obtained the following figures. The fruits chosen were of ordinary type which were not in great demand in the market. There is, as will be shown below, profit in undertaking this business on a small scale; as a cottage industry.

Yield & Economics of produce from one mat :—

Weight of juice dried per day.	Total No. of fruits.	Quantity of juice got.	No. of days taken to dry.	Quantity of crystalline sugar used.	Quantity of preserve got.
1½ lb.	240.	40 lb.	30 days.	¾ lb.	6 lb.
	Fruits 240			Rs. 0-12-0	
	Crystalline sugar ¾ lb.			" 0-1-6	
	Bamboo mat.—One Cubit Square			" 0-0-6	
				<hr/>	
				Total expenditure Rs. 0-14-0	
				<hr/>	
				6 lbs. of mango-preserve sells in the market at Rs. 2-8-0	
				<hr/>	
				Profit Rs. 1-10-0	
				<hr/>	

The above figures show that one can make a profit of Rs. 1-10-0 (or more, if the product is good, and more demand created) from 240 fruits of ordinary type, which otherwise find poor market, or result in loss by decay, and rarely fetch a few annas. A family of five members, may individually prepare the preserve, and in the season of 3 months, can make a net profit of Rs. 24-6-0, with an outlay of Rs. 13 for the whole family. If the family has a mango garden, the outlay will only be, for sugar and mats. Hence, whether one owns a mango garden or purchases the fruits, there is always a profit made. It is hoped, that mango gardeners will take to this mango-preserve manufacture, as a side line and advance the industry.

ABSTRACTS

The Control of Weevils in Rice. (*Science—New series* Vol. 79, No. 2043, February 23, 1934. *Science—supplement* pp. 5 and 6.) Coating rice with mineral dusts, to keep down heat generation during milling, also discourages the breeding of insects that infest the stored grain, according to Dr. E. R. de Ong, consulting entomologist of San Francisco.

Weevil injury to stored stocks of rice becomes very severe at times since much of the crop must be carried through the hot weather of summer until the harvest in late fall. Insect breeding is rapid at summer temperatures and a light infestation in the spring, if unchecked, may result in almost complete destruction of the stock of rice by fall.

The difference in weevil infestation of rice coated with calcium carbonate and untreated rice was noticed and experiments made to determine the value of the coating for protection alone. In a jar of uncoated rice, several living rice weevils and bran bugs were placed. A similar number of living weevils and bran bugs were placed in another jar containing rice to which one per cent. of finely ground calcium carbonate had been added. These jars were kept at a temperature ranging from 50 to 75 degrees Fahrenheit, with sufficient moisture added to favour breeding.

In sixty days the rice weevils had decreased 50 per cent. in the coated rice and 25 per cent. in the uncoated rice. The striking results, however, came at the end of a year following the higher summer temperatures which had stimulated breeding. The number of weevils in the coated rice had remained absolutely stationary throughout the year. That is, there had been just sufficient breeding to equal the small number dying. In the uncoated rice, the weevils had increased more than one thousand per cent. The bran bugs had decreased slightly in both lots of rice, they apparently not finding conditions suitable for breeding.

The weevil attack in the uncoated rice resulted in a loss in weight of 42 per cent., a cubic foot of the coated rice weighing 76 pounds and the uncoated rice 44 pounds. The infested rice also had a very dirty appearance, necessitating the expense of recleaning besides the additional loss of weight. M. A. S.

Micro-organisms in relation to soil fertility. (Jacob G. Lipman. *The Newer Knowledge of Bacteriology and Immunology* by Jordan and Falk pp. 341-350). The average cultivated soil is a good culture-medium for higher plants and for micro-organisms. There is a close relationship between the macro-flora of soils on the one hand, and micro-flora and fauna on the other. The soil fertility is affected by a series of factors both internal and external, such as physical texture, temperature, concentration and composition of soil solution, the chemical composition